

*Synopsis of the Cold Blooded Vertebrata, procured by Prof. James Orton during his Exploration of Peru in 1876-77.*

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## REPTILIA.

### OPHIDIA.

1. *BOTHRUPS PICTUS* Tsch. Jan. Elenco Sistematico, p. 126. *Lachesis pictus*, Tschudi Fauna Peruana, p. 61, Tab. X.  
Nos. 11, 14, 15, 17, 19, from Chimbote Valley, Lat. 9° S., altitude from 0 to 2000 feet.  
A very distinct species, well figured by Tschudi. In five specimens the fossa is bounded in front by the second superior labial plate, as described by Jan; in one other the fossa is surrounded by small scutella.
2. *ELAPS CIRCINALIS* Dum. Bibr. VII, p. 1210. Cope, Journal Academy Nat. Sciences, 1865, p. 182.  
No. 45, Pacasmayo.
3. *ELAPS TSCHUDII* Jan. Revue et Magazine de Zoölogie, 1859, Prodrome d'une Iconographie, etc., p. 13.  
No. 18, Chimbote Valley.
4. *OXYRRHOPUS FITZINGERII* Tschudi, Fauna Peruana Reptilia p. 56. Tab.  
No. 21, Chimbote Valley.
5. *OXYRRHOPUS CLELIA* Dandin. Dum. Bibron VII p. 1007.
6. *SIBON ANNULATUM* Linn. *Dipsas* Dum. Bibr. VII, p. 1141. *Leptodira* Günther.  
Nos. 23-25, Chimbote Valley.
7. *TACHYMENIS PERUVIANA* Wiegmann "1834" (fide Peters); Archiv. für Naturgesch. 1845, 165.  
No 72, from Cuzco; elevation 11000 feet.

This species is probably distinct from the *T. chilensis* Schleg. This conclusion is derived from an examination of Wiegmann's type in the Museum of the University of Berlin, and it is sustained by the present specimen from Cuzco. Its characters are: one preocular, eight superior labials, loreal higher than long, superior surfaces of the body and tail with four series of dark spots. The characters of the *T. chilensis* are: two or three preoculars, seven superior labials, length of the loreal equaling or exceeding the height, superior surfaces with four longitudinal brown bands.

### 8. *DRYOPHYLAX VITELLINUS* sp. nov.

Form moderately slender, head oval, narrowed to the rather depressed muzzle. Scales smooth, in nineteen longitudinal rows, with single apical fossæ. Eight superior labials, fourth and fifth entering the orbit. Ros-

ral small, as high as wide, just visible from above. Nasals depressed, loreal a little longer than high; oculars 1-2, the anterior impressed, nearly reaching the frontal. Temporals 1-1-2. Internasals longer than wide; prefrontals subquadrate. Frontal long and narrow, not angulate posteriorly; parietals notched behind, short, their common suture a little more than half the length of the frontal. Ten inferior labials, six of which are in contact with the genae, of which the posterior pair is a little longer than the anterior. Gastrosteges 202; anal double; urosteges 93.

Color yellow, strongly tinged with brown above, and with orange on the labial plates and lower surfaces.

No. 3, from Pacasmayo.

This beautiful species presents a new type of color for the genus.

9. DRYOPHYLAX ELEGANS Tsch. *Lygophis elegans* Tsch., Fauna Peruana, p. 53, Pl. VI. *Lygophis pæcilstomus* Cope, Journ. Acad. Phila. 1875, 180.

This species was described from a young individual. Examination of several adult specimens from Prof. Orton's collection shows that the last maxillary tooth is grooved, though not deeply, and that the scales have a single apical fossa. The coloration is more striking in the adult than in the young, and is quite elegant. The ground is a light yellowish gray, and there are two rows of bright rufous darker edged spots on the back. These spots are either confluent transversely, forming a single row of broad spots, or alternating, so as to form a zigzag band. The latter condition prevails on the posterior part of the body, and the band becomes regular on the entire middle line of the tail. There are three longitudinal dark gray lines on each side, one on the middles of each of the first two rows of scales, and one on the ends of the gastrosteges. These become more or less fused on the tail, forming a single lateral band. A broad brown band from the muzzle through the eye to the first dorsal spot. Lips, gular region, and anterior gastrosteges, brown speckled; a longitudinal median nuchal band. Frontal plate dusky, with a median longitudinal light band. Length of the longest specimen M. .901; tail .280.

Nos. 12, 16, 26, 27, Chimbote Valley.

This species is the type of the genus *Lygophis* Fitz. where first characterized; *i. e.* in the Fauna Peruana. It must therefore be regarded as a synonyme of *Dryophylax* Wagl. The genus to which I have given the name *Lygophis* (Proceed. Acad. Phila. 1862, p. 75, type *L. lineatus*) may then be called *Aporophis*.

10. DRYIOPHIS ACUMINATA Wied.; *Dryinus æneus*, Wagl. Dum. Bibr. VII, 819.

No. 10. Chimbote Valley.

11. DRYMOBIUS HEATHI Cope. Journ. Acad. Philada. 1875. p. 179.

This species is nearly allied to the *D. reticulatus* (*Herpetodyas*), Peters, Monatsberichte, Berlin, 1863, 285. I add to my previous description that in a large specimen, the interocular space is only .001 wider than the length

of the muzzle ; and that the brown band through the eye becomes obsolete. Length M. 1.150 ; tail .346.

The American species of *Drymobius* (Cope, Proc. Acad. Phila., 1860. 560) are the following : *D. margaritifera*, Schl. ; *D. reticulatus*, Pet. ; *D. heathii*, Cope ; *D. rappii*, Gthr. ; *D. occipitalis*, Gthr. ; *D. pulchriceps*, Cope ; *D. dichrous*, Pet. ; *D. boddaertii*, Seetz ; *D. melanolomus*, Cope ; *D. biserialis*, Gthr. ; *D. bilineatus*, Jan. ; *D. pulcherrimus*, Cope.

12. BOA ORTONII, Cope, sp. nov.

This species is intermediate in character between the *Boa constrictor* and the *B. imperator*. It has the stout proportions of both species, while the squamation of the head is like that of the former, and that of the body resembles that of the latter. There are no large scuta on the loreal or orbital regions, and the scales of the head generally are characterized by their small size. The characters of the species are best brought out in a comparative table, which I give :

Sect. I. 89-95 rows of scales on the body.

Orbital ring not in contact with labials, gastrosteges 234  
-40 ; urosteges 49-56.....*B. constrictor*.

Sect. II. 55-69 rows of scales.

*a* Orbital series separated from labials by a row of scales ;  
No large loreal plate ; form stout ; g. 252, u. 53 ; labials 19 ;  
orbital ring composed of 19 scales ; 64 rows on body.....*B. ortonii*.

*aa* Orbital ring reaching labials.  
No large loreal plate ; stout ; u. 56 : 57-62 rows on body ;  
orbitals 13-17.....*B. imperator*.

A loreal plate as large as the orbit ; proportions as in the  
last.....*B. eques*.

No large loreal plate ; form elongate ; g. 272 ; u. 69.....*B. divinitoqua*.

With the typical specimen I associate one from Greytown, Nicaragua, which agrees with it in the generally smaller size of the scales of the head and body than is found in the *B. imperator*, the usual Mexican species. It has 69 rows of scales ; 21 labials and 17 scales in the orbital ring ; gastrosteges 242.

No. 1 from Chilote, near Pacasmayo, 3000 feet above the sea. This species is dedicated to Professor James Orton, whose explorations of the western regions of South America have yielded such abundant results.

13. STENOSTOMA ALBIFRONS Wagler ; var. *tessellatum*, Tsch. Fauna Peruana, p. 46.

As Jan remarks, this form appears to be but a color variety of the *S. albifrons*.

No. 28, Chimbote Valley.

LACERTILIA.

14. PROCTOTRETUS MULTIFORMIS Cope, Journ. Acad. Phila. 1875. p. 173.

No. 98 ; from La Raia or the divide which separates the waters of the Ucayali and those of Lake Titicaca ; altitude 14,000 feet.

## 15. PROCTOTRETUS FITZINGERII Dum. Bibr. IV, p. 286.

No, 138, from Juliaca, Peru; altitude 12,550 feet. In this lizard the lateral scales are relatively smaller and smoother than in the *P. multiformis*.

## 16. MICROLOPHUS INGUINALIS Cope, Journ. Acad. Phila. 1875. p. 172.

Nos. 33-34, Chimbote Valley. 2000 feet.

17. MICROLOPHUS PERUVIANUS Sess. *M. lessonii*, Dum. Bibr. IV, p. 336.

Nos. 31-36, Chimbote Valley. 2000 feet.

## 18. PHYLLODACTYLUS NIGROFASCIATUS sp. nov.

The existence of a fourth species of this genus in Western Peru points to this region as its centre of distribution. The present one belongs to the group in which the large dermal tubercles are not prominent nor angulate, nor arranged in regular longitudinal rows. They are round, and very distinct from the small round scales between them, and not almost assimilated to them as in the *P. inaequalis* Cope. There are eight superior labials to below the pupil of the eye. The mental scutum is very large, and urceolate; it has two lateral, and a short posterior median facet, each one corresponding to a scutum. The anterior of these is the first labial, which is about twice as large as the scutum that follows it. Behind these is a transverse row of five subround scales, of which the median is in contact with the mental. The next row embraces eight, arranged in an undulating manner. The scales diminish but slowly to the size of the gulars.

The toes are slender as in the *T. microphyllus* Cope, but the expansions are large, as in the *T. inaequalis*. When the limbs are appressed to the side, the elbow reaches the base of the toes in this species, but only to their tips in the *T. inaequalis*; the length of the toes in *T. microphyllus* is intermediate.

The ground color is very light, brilliantly white on the inferior surfaces. Between the axilla and groin the back is crossed above by six narrow black cross-bands. These bifurcate or break up on the sides; the axillar band breaks up on the back, and two anterior to it are represented by spots. A broad dark band passes from the nostril through the eye and breaks up on the sides of the neck. Limbs indistinctly cross-barred.

	M.
Length to meatus auditorius.....	.013
"    "    axilla.....	.020
"    "    groin.....	.039
"    "    vent.....	.043
Width at meatus auditorius.....	.007
Length of fore limb.....	.014
"    "    "    foot.....	.004
"    "    "    hind limb.....	.021
"    "    "    "    foot.....	.0065

The very different arrangement of the infralabial scales and the small

digital expansions with other characters of the *P. microphyllus*\* render comparisons with it unnecessary. From the nearer *P. inæqualis*† it differs primarily in three features : (1) the greater relative size of the tubercles ; (2) the differently arranged infralabials, and (3) in the longer digits.

No. 35, Chimbote Valley. 2000 feet.

19. PHYLLODACTYLUS REISSII Peters Monatsber. Berl. Academy, 1862, 626.

No. 140, from Pacasmayo.

## BATRACHIA.

### ANURA.

20. NOTOTREMA MARSUPIATUM Dum. Bibr. VIII, 598, pl. 98, (*Hyla*).  
*Nototrema* Gthr.

Nos. 28, Chimbote Valley ; 127-8, Pisac ; altitude 10,500 feet.

21. CHOROPHILUS CUZCANUS sp. nov.

A species of medium size in a genus where the species are never large. Form rather robust, head wide, flat ; canthus rostrales well marked but contracted. Nostrils near the end of the muzzle, which is obtusely rounded. Tympanum distinct, its diameter half that of the eye slit, which is nearly as long as the muzzle in front of it. The limbs are rather elongate, and the digital dilatations are quite small. The wrist of the extended fore limb reaches the end of the muzzle, and the elbow is slightly overlapped by the knee when both are appressed. When the hind limb is extended forwards, the heel reaches to the line of the front of the orbit. There are no tubercles on the sole, and the skin of the superior surfaces of the body is smooth, while that of the thorax and abdomen is closely areolate.

The vomerine teeth are in two full and closely approximated fascicles between the internal nares, their posterior borders projecting a little behind the posterior margins of the latter. The nareal openings are small, and about equal to the ostiopharyngea ; the tongue is discoid, and is openly notched on the posterior free border, which constitutes about one-third the length of the organ.

Color of the upper surfaces dark olive ; of the limbs paler ; the femur uniform light olive, posteriorly. Inferior surfaces dirty white, except those of the thighs, which are pale yellow. Sides of the head to the tympanum dark, bordered above by a blackish line along the canthus rostralis, and below by a light labial border.

	M.
Length of the head and body.....	.0230
Length of head to posterior line of tympanum.....	.0075
Width " at " " " ".....	.0093
Total length of fore limb.....	.0165
" " " hind ".....	.0375
Length of foot.....	.0170
Length of tarsus.....	.0065

\* Cope, Journal Academy, Phila. 1875, p. 175. † Loc. cit., p. 174.

This species is one of those forms which is near the boundaries of the families of *Hylidae* and *Cystignathidae*. It agrees with the other species of the genus to which I have referred it in essential respects; *i. e.*, in the free toes, the fronto-parietal fontanelle, and the small and separated prefrontals. The last two characters distinguish it from *Hylodes* to which it bears a superficial resemblance, as also the terminal phalanges, which lack the transverse limb of that genus. The sacral diapophyses are but little dilated. It is noteworthy that this frog is the first one which presents these characters, known from South America, all the species of *Chorophilus*, five in number, being North American.

22. *CYCLORHAMPHUS ANGUSTIPES*, sp. nov.

A species of medium size, remarkable for the small extent of the palmation of the toes. The muzzle is short and rounded, its profile retreating backwards to the superior, rather elevated plane. Canthus rostrales obsolete; nares one-third nearer to the border of the orbit than to that of the upper lip. The orbits look somewhat upwards and forwards, the tympanic membrane is not visible in the derm, but exists as a small vertically oval membrane whose long diameter is one-third the vertical diameter of the eye. The skin is everywhere perfectly smooth. The thumb and second finger are of equal lengths. The web of the hinder foot is deeply notched, the edge marking the middle of the first phalange of the fourth toe; that between the first, second and third toes joining the adjacent longer toe at a still lower point. The wrist of the extended fore limb exceeds the end of the muzzle, while the heel reaches to the nostril; the tibia equals the foot without the tarsus. The choanæ are larger, and the ostiopharyngea very small. The vomerine fascicles are small and close together; they fill the narrow space between the inner borders of the choanæ. The tongue is nearly round, entire, and has the posterior fourth free.

M.

Length of head and body.....	.038
Length of head to posterior line of tympana.....	.011
Width of head at " " ".....	.019
Length of fore limb.....	.025
" " foot (greatest).....	.010
" of hind limb.....	.061
" of hind foot.....	.029
" of tibia.....	.017

Color above, dark plumbeous; below, a light lead color.

No. 136, from Juliaca; altitude 12,550 feet.

The characters which distinguish this species from the *C. amareus*, are, the greater length of the limbs, the closer approximation of the choanæ; the absence of dermal margins to the toes, the absence of cuneiform tubercle, and the close union of the metatarsal bones in the sole. This arrangement gives the sole a narrow form, without the expansiveness seen in *C. amareus*, where the grooves between the metatarsals are distinct.

23. *CYCLORHAMPHUS ÆMERICUS* Cope. Proc. Acad. Phila. 1874, p. 125.

Nos. 48, 49, 50, from Yura, near Arequipa; altitude 8000 feet; Nos. 81-4, from Cuzco; altitude 11,000 feet. Specimens from Cuzco are darker colored than those from Yura. They are dark plumbeous with large round black spots above; the latter are lighter plumbeous with or without dark gray smaller spots. In males from the latter locality the thorax is covered with corneous asperities and there is a large shield of horn on the inner aspect of the thumb, which is covered with acute projections.

24. *CYCLORHAMPHUS PUSTULOSUS*, sp. nov.

The largest species of the genus, distinguished by its large head, and the prominent tubercles of the sides and coccygeal region.

The head is wide and flat, with the loreal region and the muzzle oblique. The canthus rostrales are obsolete, and the nares, although at the end of the superior plane of the muzzle, are equidistant between the orbit and the labial border. The membranum tympani is concealed by the skin and is a vertical oval, whose long diameter is less than half that of the eye slit. The fingers and toes are elongate, especially the last or unguis phalange; the wrist reaches considerably beyond the muzzle, and the heel to the front of the orbit. The hind foot is only half webbed, and is considerably longer than the tibia. The skin is smooth, excepting on the sides between the ilia round the vent, the superior face of the tibia, and the sole of the foot. These localities are all tubercular; the limbs with small dark warts, the side with small, obtuse, and very prominent warts, and the iliac region with larger obtuse warts.

The choanæ are not very much approximated, and the vomerine patches between them are very small. The ostia pharyngea are very minute and situated well within the external borders of the mouth. The tongue is wider than long, and entire.

Color, dark lead color everywhere excepting the gular region and the tips of the lateral warts, which are dirty white. Upper regions indefinitely shaded with brown and gray.

	M.
Length of head and body.....	.060
"    "    to posterior line of tympana.....	.018
Width of head at    "    "    .....	.024
"    of sacral expanse.....	.012
"    of interorbital space.....	.005
Length of fore limb.....	.038
"    of fore foot.....	.016
"    of hind limb.....	.087
"    of hind foot.....	.042
"    of hind tarsus.....	.010
"    of tibia.....	.025

No. 111, from Tinta; altitude 11,400 feet.

## 25. PLEURODEMA CINEREUM, sp. nov.

Muzzle oval, vertically truncate at the end and elevated; canthus rostrales obtuse, loreal region little oblique; nares terminal. Membrum tympani distinct, round, its diameter one-third that of the eye-slit. Wrist extending to muzzle, and the heel to the middle of the orbit. Two large palmar tubercles. Cuneiform tubercles of sole prominent, not sheathed with horn, the outer solar tubercle not prominent; no proximal tarsal tubercle. Tarsus short; remainder of foot longer than tibia. Skin with low warts on all the upper surfaces of the head and body; inguinal gland moderate, oval. Posterior inferior femoral region areolate.

The vomerine teeth are in small fasciculi extending backwards from the line of the anterior margins of the choanae. The latter are twice as large as the small ostiopharyngea. The tongue is a wide oval, has a slit-like notch behind and is one-half free.

Color above gray leaden, with indistinct darker plumbeous spots, of which the largest is between the orbits. There are three wide vertical dark gray bands at the upper lip, the last one on the tympanum, and two paler similar bands between them. Numerous black spots on the groin; a black crescent on the inguinal gland. Limbs dark cross-banded above; posterior face of femur darkly gray spotted. Lower surfaces dirty white; gular region gray dusted.

	M.
Total length of head and body.....	.027
Length of head to posterior line of tympana.....	.008
“ “ at “ “ “ “ .....	.010
Width of sacral expanse.....	.0055
Length of fore limb.....	.0170
“ “ foot.....	.0070
“ of hind limb.....	.0410
“ “ foot.....	.0180
“ of tarsus.....	.0050
“ of tibia.....	.0110

No. 137, from Juliaca at 12,550 feet.

26. BUFO CHILENSIS Tschudi, Batr. 88. Dum. Bibr. VIII, 678. *B. spinulosus* Weigm.

Nos. 2 and 4, Pacasmayo on the coast; 47, Arequipa, 7,500 feet; 52, Chimbote Valley; 54-56 and 124-126, Urubamba, Eastern Peru, 10,000 feet; 73-9, Cuzco, 11,000 feet; 87-8, Yaurisque, East of Cuzco, on the Apurimac, 10,500 feet; 103-110, Tinta, 11,000 feet; 129-135, Juliaca, 12,550 feet.

Having arranged the above thirty-six specimens of this toad in the order of the elevation above the sea at which they were found, beginning at the coast, and rising to 12,550 feet, I have discovered no characters of surface, of color, or of any other kind which are related to the habitats. Two of the three specimens from Pacasmayo, ♂ and ♀, are twice the average size of the others; the third one is as large as the largest of the others. Several specimens have spinulose warts.



## PISCES.

## HYOPOMATA.

It has sometimes appeared to the writer that a modification might with advantage be introduced into the system of Fishes, as left in his synopsis of the osteology of the subject, published in the Transactions of the American Philosophical Society, 1870, p. 449, and the Proc. Amer. Ass. Adv. Science, 1871, p. 326. The sub-classes of fishes there recognized were five; viz. the *Holocephali*, the *Selachii*, the *Dipnoi*, the *Crossopterygia*, and the *Actinopteri*. As it appears that the structural differences existing between the last two divisions are not so great as those which distinguish the others, it is proposed to combine them into a single sub-class, to be called the *Operculata*. The definitions of the four sub-classes will then be as follows:

I. Suspensorium continuous with the cartilaginous cranium, with no hyomandibular nor rudimental opercular bone; no maxillary arch; pelvic bones present; axial series of fore limb shortened, the derivative radii sessile on the basal pieces; axial series of hinder limb prolonged in ♂. . . . . *Holocephali*.

II. Suspensorium articulated with the cranium; no maxillary arch; no opercular nor pelvic bones; bones of limb as in the last . . . . . *Selachii*.

III. Suspensorium rudimental, articulated with cranium, supporting one or more opercular bones; cranium with superior membrane bones; no maxillary arch; a median pelvic element; the limbs supported by segmented unmodified axes. . . . . *Dipnoi*.

IV. Hyomandibular and palatoquadrate bones articulating with cranium, supporting opercular bones; a maxillary arch; no pelvic element; axes of the limbs shortened, the derivative radii sessile on the basal pieces. . . . . *Hyopomata*.

The primary divisions of the *Hyopomata* are indicated by the structure of the fins, of which there are three principal modifications, as follows:

A. Derivative radii present in both limbs; in the anterior supported by an axial segment with one or more basal or derivative radii, forming a peduncle; in the hind limbs the derivative radii sessile on axial segment only. . . . . *Crossopterygia*.

B. Derivative radii few in the fore limb, sessile on scapula; present in hind limb, and sessile on axial segment. . . . *Chondostei*.

C. Derivative radii few in the fore limb, sessile on the scapula; wanting or very few and rudimental on the hind limb so that the dermal radii rest on the axial element. . . . *Actinopteri*.

The classification of the *Actinopteri* then continues as in the memoirs above quoted.

27. *CORVINA AGASSIZII* Steindachner Sitzungsber, K. K. Acad. Wiss. 1875 (April), p. 26.

Nos. 5 and 43, from Pacasmayo and Chimbote Bays. These specimens have an indistinct longitudinal stripe extending along each row of scales above the middle of the body; cross-bands are not apparent. D XII-1-21; A 2-10.

28. *BLENNIUS TETRANEMUS*, sp. nov.

Radii; D. XIX-13; P. 13; V. I-2; A. II-18; first dorsal fin commencing above the preopercular border, with many of the rays of subequal length, which does not exceed the distance from their bases to the pectoral fin. An open notch between the first and the more elevated second dorsal fin. In only one out of seven specimens there is a pair of curved teeth behind the premaxillaries; none in the lower jaw. Interorbital space narrow, deeply grooved; behind the orbits a transverse groove behind which the vertex is swollen. A slender postnarial tentacle, a long tentacle above the posterior part of the orbit deeply split into four subequal portions; no fringes at its base nor behind the orbit.

Orbit a little more than one-fourth the length of the head; the head three and a-half times in the length without the caudal fin; depth four times in the same.

Color light brown, the sides marbled with darker brown; seven quadrate brown spots on each side of the base of the dorsal fin. Sides of head speckled with dark brown; a large brown spot behind the eye which separates two wide light bars, one of which extends downwards and backwards from the eye, and one backwards. Anal fin dusky with a light margin; dorsal with obscure brown shades.

	M.
Total length.....	.073
Length to base of pectoral.....	.019
"    "    ventral.....	.016
"    "    anal.....	.033
Diameter of orbit.....	.0045
"    interorbital space.....	.0015

From Pacasmayo Bay.

29. *CLINUS MICROCIRRHIS* Cuv. Val. XI p. 384. Geog. Hist. Chile Zool. II p. 275. D. XXV-12; V. I. 3; A. II-22.

No. 39, from Callao Bay.

30. *CLINUS FORTIDENTATUS*, sp. nov.

A shorter species than the last with the external teeth in both jaws larger.

Radii; D. XIX-13; V. 15; V. 1-3; A. II-20; C. 1-12-1; the dorsal fin commencing above the preopercular border; the pectoral reaching to the base of the anal. Dorsal spines rather short, about half as long as the soft rays. The greatest depth is opposite the base of the pectoral fin; the front is regularly decurved to the rather compressed muzzle, where the

tips are about equal. Scales in a vertical line from the vent, 19-35. The diameter of the eye enters the length of the head 5.4 times; the head enters the length 4.17 times; and the depth into the same 4.5 times. There is a small cirrus at the anterior nostril; a stout short one with a fringed border projecting from below the superior posterior border of the orbit, and a dermal flap with a fringed border on each side, extending from near the middle line, along the posterior border of the skull to opposite the superior third of the orbit. The teeth in both jaws are of two kinds; the external larger in a single row, and the internal smaller, in several rows of the former are stout and compressed, and considerably exceed in size the corresponding ones of the *C. monocirrhis*. The patches of small teeth are confined to the anterior part of the lower jaw, but extend a little further posteriorly in the upper jaw. The palatine teeth are few and coarse.

M.

Total length.....	.233
Length to orbit.....	.022
“ base of pectoral fin.....	.073
“ “ anal fin.....	.115
“ “ caudal fin.....	.023
Depth of body at origin of anal.....	.050
Interorbital width.....	.009

The color is a light, leathery-brown, with four vertical cross bars of a darker brown, of which lateral portion projects posteriorly from the dorsal portion. In addition to these, the body and head are thickly marked with small, dark-brown spots; similar spots on the dorsal caudal and base of pectoral fins.

No. 40, Callao Bay.

### 31. SICYASES PYRRHOCINCLUS, sp. nov.

A small species of rather slender form. The head is one-fifth of the total length including caudal fin; the depth of the body is one-eleventh of the same. The long diameter of the orbit is one-fourth that of the head, exceeds the length of the muzzle, and enters the interorbital width one and one-half times. The front is flat, and the mouth very small, with a few large tridentate incisors, and a smaller number of smaller teeth on each side of them in each jaw. The incisors are six above, subvertical, and four below, subhorizontal. Radial formula D. 5; C. 1-7-1; A. 4; V. 4; P. 20. The posterior disc margin is wide, and extends in a broad lamina, vertically behind the pectoral fin. Pectorals and ventrals connected by membrane. Suctorial disc 5.6 times in total length; its anterior free margin narrow.

Measurements.

M.

Total length.....	.034
Length to anterior margin of disc.....	.0045
“ “ anus.....	.016
“ “ dorsal fin.....	.020
“ “ anal “.....	.021
“ “ caudal “.....	.028

The dorsal region is crossed by five wide brown spots, the anterior between the bases of the pectoral fins, those following becoming successively nearer together. They are all joined together on the sides by a brown border which presents processes downwards so as to be scolloped. Below this the surface is white. The dorsal spaces enclosed between the spots, together with the top and sides of the head are marked with a crimson network. Two chain-like bands on the operculum, and two on the base of the pectoral fin.

The precise locality from which this species was obtained, has not been preserved.

32. *ATHERINA LATICLAVIA* Cuv. Vol. X, p. 473.

No. 41, Callao Bay.

33. *BELONE ? TRUNCATA* Les. Gunther Catal. Fishes Brit. Mus. VI. p. 224.

Differs from Atlantic specimens in having the tail evenly though slightly emarginated. Radii; D. 14; A. 17. No. 42; from Callao Bay.

I find that in the genus *Belone*, the coronoid bone is distinct from the other mandibular bones, and is well-developed. In *Amia*, where it has been stated to be distinct, it is coössified in old individuals.

34. *ORESTIAS CUVIERII* Cuv. Val. XVIII p. 225.

Fin radii; D. 15; A. II. 16. Scales in fifty-three transverse series to above superior extremity of branchial fissure. Orbit one-fifth of head; length of head 3.5 times in total without caudal fin. Top of head and each side of anterior dorsal region naked.

No. 142. Lake Titicaca.

35. *TETRAGONOPTERUS IPANQUIANUS*, sp. nov.

This species is furnished with a series of teeth on the maxillary bone as in the *T. pectinatus*, *T. polyodon*, etc., but is only comparable to the latter in adding to this character, a reduced number of radii of the anal fin. It differs from it in the smaller and more numerous scales.

The head is short, and the lower jaw robust and somewhat protuberant. Its length enters the total with caudal fin 5.75 times; it includes the diameter of the eye four times, which enters the diameter of the very convex interorbital space 1.6 times. Muzzle abruptly descending, shorter than orbit. The proximal two-thirds of the maxillary bone toothed. Dorsal fin originating behind the basis of the ventral, its last ray standing above the first anal ray. Caudal fin deeply forked, the superior lobe larger. Radii; D. I. 9; A. I. 28. Scales 11-54-61-8. The general form is moderately elongate, the depth entering the length without the caudal fin, three and one-fifth times.

	M.
Total length.....	.125
Length to orbit.....	.005
“ “ dorsal fin.....	.044
“ “ anus.....	.051
“ “ anal fin.....	.057
“ “ caudal fin.....	.093

Color silvery, with a narrow dorsal dusky line, and a leaden shade along the upper part of the side, which continues to the notch of the caudal fin. The anterior part of this band is enlarged into a scapular spot.

Nos. 69-70 and 122 from the upper waters of the Urubamba, one of the sources of the Ucayale. The other species of this section of the genus, the *T. polyodon* Gthr. is from the neighborhood of Guayaquil.

Dedicated to the memory of the inca Ypanqui, who in the city of Cuzco on the Urubamba, the first of his line, devoted himself to monotheism.

36. ENGRAULIS TAPIRULUS, sp. nov.

There are minute teeth in both the jaws, and the obliquely truncated extremity of the maxillary bone does not reach the articulation of the mandible with the quadrate. None of the fin rays are elongate, and the muzzle projects in a compressed, conical form beyond the mouth. The length of the head exceeds the depth of the body, and enters the total length without the caudal fin, three and one-third times. The depth of the body enters the same, four and one-fifth times. The eye is large, the diameter entering the length of the head four and one-half times, and exceeding the length of the rather elongate gill-rakers. Fin radii; D. I. 11; A. 25; the former originating above a point behind the base of the ventral fins; its last rays standing above the base of the first anal ray. Its first ray is equidistant between the base of the caudal fin, and the line of the anterior border of the orbit. Scales in 36-7 transverse series, deciduous. Abdomen moderately trenchant.

	M.
Total length.....	.120
Length to orbit.....	.006
“ “ border of operculum.....	.080
“ “ ventral fin.....	.050
“ “ anal “ .....	.070
“ “ caudal “ .....	.100

This species is, according to the descriptions given by Dr. Günther, most nearly allied to the *E. surinamensis*, and *E. poeyi*, but differs in many respects. The two specimens probably came from Pacasmayo Bay.

37. TRICHOMYCTERUS PARDUS Cope, Proceedings Academy, Phila. 1874, p. 132.

Numerous specimens from Jequetepeque.

After comparison of this first with many individuals both old and young, of the *T. dispar*, my opinion in favor of its specific distinctness from that species is confirmed. In order to present its characters in connection with those of other *Trichomycteri*, the following table is presented. A large specimen of the *T. pardus*, which, according to the label, came from Callao Bay, differs from those from Jequetepeque in having small spots instead of the large blotches characteristic of the species:

- I. Dorsal fin entirely in front of anal.
- a. Dorsal partly over base of ventrals.

Head one-sixth total length;\* D. 7-8; A. 5-6; form slender; spots few, large.....*T. pardus*.

II. Dorsal fin partly over anal fin.

a. Dorsal fin partly over ventrals.

Head 4.5 to 5.5 in total length; D. 9; A. 6; gray, uniform or black speckled.....*T. dispar*.

aa. Dorsal fin behind base of ventrals.

Head 5 times in total; D. 7; A. 5; closely marbled with dark brown above and below.....*T. rivulatus*.

Head 6 times in total; D. 7; A. 6; straw-colored with a few faint specks.....*T. gracilis*.

Head 6.5 and 7 times in total; D. 8; A. 6; coarse, brown, confluent blotches, finer above anteriorly; forming two series posteriorly with pale band between.....*T. poeyanus*.

The species *T. maculatus*, *T. punctulatus* and *T. areolatus* C. & V., are characterized by a larger number of rays (11-15) in the dorsal fin, than that found in any of the preceding.

38. TRICHOMYCTERUS DISPAR Tschudi; Günther, Catal. Brit. Mus. V, p. 273.

All the specimens of this species as above defined come from the headwaters of the Amazon, as was found to be the case by Tschudi (see Fauna Peruana). They are Nos. 89 and 92-4 and 101 from Tinta on the Vileanota, the source of the Ucayali, elevation 11,400 feet; Nos. 57-60 and 113-121 from the Rio Urubamba at Urubamba, elevation 10,000 feet. The very young have an interrupted dark lead-colored lateral band, which with growth is resolved into spots, and disappears. None of the specimens present the numerous dorsal radii ascribed by Dr. Günther to his *T. dispar*, which is doubtless the *T. maculatus* of Cuv. Val.

39. TRICHOMYCTERUS RIVULATUS Cuv. Val. Vol. XVIII, p. 495.

This species, which is characterized by a smaller number of dorsal radii than the last, among other points, is represented by a large specimen (No. 143) from Lake Titicaca. Native name, Suche.

40. TRICHOMYCTERUS GRACILIS Cuv. Val. XVIII, p. 497.

The principal characters of this fish have been already pointed out: I add the following:

The depth of the body is one-sixth the total length with caudal fin. The eye is a little nearer the line connecting the posterior borders of the opercula than that which is tangent to the end of the muzzle. Nasal barbel extending a little beyond the eye. Radii; D. 6½; C. 4-11-3; A. 5½; V. 1.5; P. 9.

The color is a greenish straw-color with very faint dots closely placed on the dorsal region; lower surfaces unicolor; spots more distinct on top of head. An indistinct dark band extends on each side of the dorsal region from the beard to behind the dorsal fin.

\* Including caudal fin.

	M.
Total length.....	.290
Length to end of operculum.....	.042
“ “ ventral fin.....	.140
“ “ vent.....	.151
“ “ dorsal fin.....	.160
“ “ anal “ .....	.170
“ “ caudal “ .....	.250

This species resembles the light varieties of the *T. dispar*, but differs in the more posterior position of the dorsal fin, and the smaller number of its radii.

No. 91, large specimen from Tinta

I give the above description of a species probably named by Cuvier and Valenciennes, but no one can ascertain from their writings whether this is the case or not.

41. TRICHOMYCTERUS POEYANUS Cope, sp. nov. *Trichomycterus riculatus* “Cuv. Val.” Cope, Proceed. Academy, Philada. 1874, p. 132.

This species, formerly identified by me as above, I now name, dedicating it to my friend Prof. Felipe Poey of Havana.

42. ARGES SABALO Cuv. Val. XV, p. 335. Nos. 62-6 and 115 and 123, from the Rio Urubamba, at an altitude of 10,000 feet.

43. OPHICHTHYS UNISERIALIS, sp. nov.

Maxillary and mandibular teeth acute, in two series; premaxillary and vomerine teeth in single series; no distinct canine teeth, the premaxillaries the largest. Cleft of the mouth moderate, two-fifths the length of the head, which is one-half that of the body. Muzzle slightly projecting more than twice as long as the diameter of the eye. Body less than half as long as the tail. Pectoral fin a little more than one-third the length of the head, the dorsal originating nearly above its posterior sixth. Free portion of the tail very short; the terminal inch of both dorsal and anal fins enclosed in a deep groove between two vertical dermal laminae. Length M. 0.330.

Color above dark brown, below a little paler, the two colors separated by a water line. Along the lower border of the dark brown is a series of small yellowish spots a half inch apart, which are invisible on the posterior half of the length.

From Peru, probably Pacasmayo.

A species allied to the *O. parilis* and *O. dicellurus* of Richardson.

44. MUSTELUS MENTO, sp. nov.

Snout elongate, the length anterior to the mouth, exceeding the width between the external borders of the anterior nostrils, and considerably greater than the length between the angles of the mouth, external measurement. Anterior base of the anterior dorsal fin above the middle of the inner border of the pectoral fin; the extremity of posterior portion reach-

ing the line drawn vertically from the base of the ventral fin. The posterior extremity of the base of the second dorsal stands above the beginning of the last third of the base of the anal. The proximal portion of the inferior limb of the caudal fin, is very little prominent. The teeth are transverse and present only a low transverse median keel.

Uniform leaden brown above; below light yellowish brown.

	M.
Total length.....	.303
Length to bases of superior teeth.....	.026
"    "    pectoral fins.....	.072
"    "    ventral fins.....	.143
"    "    anal fins.....	.202
Width between upper lips at angle of mouth.....	.019

From the Pacific Ocean at Pacasmayo, Peru.

This shark differs from the species described by Günther in the relatively long muzzle and narrow arcade of the mouth, excepting in the case of the *M. manayo* Schleg., which differs from the *M. mento* in the more posterior position of the dorsal fin. Prof. Gill has described two species from the Pacific Ocean, the *M. californicus* and *M. dorsalis*.\* The former differs from the present one in the more posterior position of the ventral fins which are considerably behind the posterior angle of the dorsal, and the muzzle is shorter. In the *M. dorsalis* from Panama the dorsal fin is, according to Prof. Gill, more posterior in position, since only one-fourth of its base stands above the pectoral; in *M. mento*, three-fourths of the base of the dorsal stands above the ventral fin.

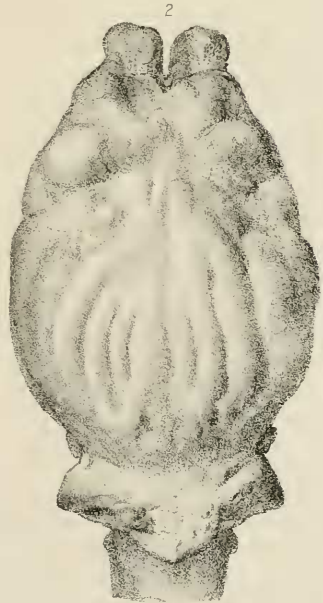
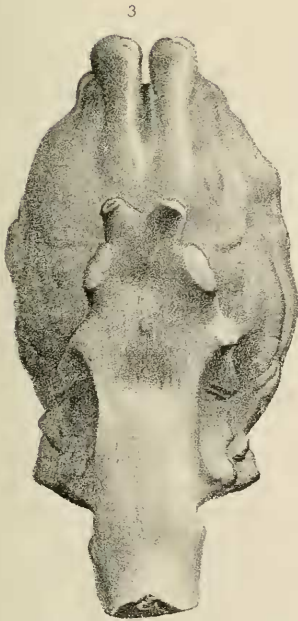
#### 45. PSAMMOBATUS BREVICAUDATUS, sp. nov.

Anterior borders of the disc broadly rounded, consisting of the anterior portions of the pectoral fins, the only indication of the snout being a small tubercle below the median point. Disc broader than long, subrhombic, the lateral margins broadly rounded. Posterior border of pectoral fin overlapping the anterior part of the ventral. Ventral fins with the border not very deeply emarginate. Tail only one-fifth longer than the claspers, with broad lateral fold, two superior, and a rudimental terminal fin. Nasal fissures with two laminae, which are not united with each other nor with those of the opposite side. The posterior or internal is anteroposterior, the anterior or external, is rolled into a tube.

The distance between the outer margins of the nostrils is equal to that between each one and the extremity of the snout, and one-half greater than that between each and the nearest part of the margin of the disc. The interorbital space is little concave, and is wide, exceeding the combined length of the orbit and spiracle. The upper surface of the head, and a broad band on both surfaces of the anterior part of the disc are covered with minute spinules. The other surfaces are smooth, with the following exceptions. Two spines anterior to the orbit above; a spine near the

\* Proceedings Academy, Phila., 1864, p. 148-9.





*Procamelus occidentalis*  $\frac{2}{3}$ .